

The ToxGuide™ is developed to be used as a pocket guide. Tear off at perforation and fold along lines.

Sources of Exposure

General Populations

- Because of the persistence of both heptachlor and heptachlor epoxide, exposure to the general population can occur from contaminated food, milk, water, soil, and air.
- Contaminated foods might include fish, shellfish (e.g., clams), dairy products, vegetables, meat, and poultry.
- Children and toddlers drink large amounts of milk and may have greater exposure if the milk is contaminated with heptachlor or heptachlor epoxide.
- Exposure can also occur when you drink water, breathe air, or touch contaminated soil at hazardous waste sites that contain heptachlor or heptachlor epoxide.
- People who live in homes where heptachlor was used for termite control or on farms where heptachlor was used on crops may have a higher risk of exposure through contaminated crops, soil, water, and air.

Occupational Populations

- Workers who use heptachlor to kill fire ants are exposed if they breathe in the heptachlor or get it on their skin.

Toxicokinetics and Normal Human Levels

Toxicokinetics

- Heptachlor has a very short half-life in animals, whereas heptachlor epoxide has a long one, especially in adipose tissue.
- Heptachlor is rapidly converted to heptachlor epoxide.
- The presence of heptachlor in biological media may reflect exposure to heptachlor or chlordane because heptachlor is a metabolite of chlordane. The presence of heptachlor epoxide may reflect an exposure to heptachlor or to chlordane since heptachlor epoxide is a metabolite of both these pesticides.

Normal Human Levels

- Levels measured in blood or serum were found to be below the detection limits for much of the population and in the range of 0.1 part per billion (ppb) for others.
- Heptachlor and heptachlor epoxide, due to their high lipid solubility, have both been found in human milk, but at levels below one part per million (ppm).

Biomarkers/Environmental Levels

Biomarkers

- No specific biomarkers or clinical conditions due to exposure to heptachlor or heptachlor epoxide are known.

Environmental Levels

Sediment and Soil

- Heptachlor was found in less than 1% of soil samples tested with an average level of 4 parts per billion (ppb). No heptachlor epoxide was found in those same samples.

Water

- Heptachlor was found in less than 2% of the groundwater samples known to be contaminated by pesticide application. The average level was 800 parts per trillion (ppt).
- In one survey, levels of less than 800 ppt were found for heptachlor in drinking water.
- Contaminated fish have been found to contain 2 to 750 ppb of heptachlor and 0.1 to 480 ppb heptachlor epoxide.

Reference

Agency for Toxic Substances and Disease Registry (ATSDR). 2005. Toxicological Profile for Heptachlor/Heptachlor Epoxide (Draft for Public Comment). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service

ToxGuide™

for Heptachlor



CAS# 76-44-8

Heptachlor Epoxide



CAS# 1024-57-3

September 2005

U.S. Department of Health and
Human Services
Public Health Service
Agency for Toxic Substances
and Disease Registry
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ATSDR
AGENCY FOR TOXIC SUBSTANCES
AND DISEASE REGISTRY

Chemical Information

Pure Heptachlor is a white powder

- Heptachlor epoxide is a breakdown product of heptachlor and is made by bacteria in the environment. Animals and people also make heptachlor epoxide when heptachlor enters their bodies.
- There are no natural sources of heptachlor or heptachlor epoxide.
- Heptachlor was used in the past for killing insects in homes, in buildings, and on food crops. It has not been used for these purposes since 1988.
- Heptachlor is still approved by the Environmental Protection Agency (EPA) for killing fire ants in power transformers.
- Heptachlor is both a breakdown product and a component of the pesticide chlordane.
- Heptachlor does not burn easily and does not explode.
- Heptachlor does not dissolve easily in water.
- Heptachlor smells somewhat like camphor.
- About 20% of heptachlor is changed within hours into heptachlor epoxide in the environment and in your body.
- Heptachlor sticks to soil very strongly and evaporates slowly into the air.

Routes of Exposure

- Inhalation – Primary route of occupational exposure when workers breathe spray they apply to control fire ants. A small, but additional route for people that live in homes that were treated long ago for termite control with heptachlor.
- Oral – Primary route for the general population from eating contaminated foods or drinking water. Infants may be exposed through mother's milk, if it contains heptachlor or heptachlor epoxide.
- Dermal – Additional route of occupational exposure when workers get spray on them from the application of heptachlor to control fire ants.

Heptachlor/Heptachlor Epoxide in the Environment

- Heptachlor is converted to heptachlor epoxide in the environment. The heptachlor epoxide is degraded more slowly and is thus more persistent.
- Heptachlor partitions somewhat rapidly to the atmosphere from surface water and that volatilization is significant. In contrast, heptachlor epoxide adsorbs strongly to suspended and bottom sediments. Heptachlor in water has an estimated half-life of 3.5 days.
- Temperature and humidity affect the persistence of heptachlor and heptachlor epoxide in soil, as can the amount of organic matter present.
- Heptachlor and heptachlor epoxide are also taken up by plants and both may bioconcentrate in aquatic and terrestrial food chains.

Relevance to Public Health (Health Effects)

Health effects are determined by the dose (how much), the duration (how long), and the route of exposure.

Minimal Risk Levels (MRLs)

Inhalation

- The available inhalation data are considered inadequate for the development of MRLs for heptachlor and heptachlor epoxide.

Oral

- An MRL of 0.0001 mg/kg/day has been derived for intermediate-duration oral exposure (15-364 days) to heptachlor.

Health Effects

- Slight increases in liver enzyme levels and liver weight were seen in exposed animals, but no histopathological changes were found.
- No major changes or effects were found on hematological, gastrointestinal, cardiovascular or renal systems.
- Only slight changes in some neurological tests were found in animal studies. However, changes were found in offspring of exposed animals.
- A number of animal studies have demonstrated reproductive effects and several have shown developmental effects on the next generation.

Children's Health

- Children are likely to be more susceptible than adults to exposure to heptachlor and heptachlor epoxide.
- Changes in performance using tests of nervous system function were found in a small group of high school students found to have been exposed.